

## WHAT IS CLAIMED IS:

1. A method for detecting and localizing a cell-specific antigen in a mammal comprising the steps of:
  - (a) obtaining peripheral blood mononuclear cells from said mammal,
  - 5 (b) exposing said peripheral blood mononuclear cells to a peptide that displays an immunogenic epitope of said cell-specific antigen under conditions such that T lymphocytes in said peripheral blood mononuclear cells undergo antigen-specific activation, thereby producing antigen-specific T lymphocytes that bind to said cell-specific antigen;
  - (c) labeling said antigen-specific T lymphocytes with a label that is detectable by  
10 imaging, thereby producing labeled antigen-specific T lymphocytes,
  - (d) administering said labeled antigen-specific T lymphocytes to said mammal, and
  - (e) determining the distribution of said labeled antigen-specific T lymphocytes in said mammal by imaging, thereby detecting and localizing said cell-specific antigen in the  
15 mammal.
2. The method of Claim 1 wherein the step (b) of exposing said peripheral blood mononuclear cells to said peptide is performed in the presence of interleukin-2 (IL-2).
3. The method of Claim 1 wherein the step (b) of exposing said peripheral blood mononuclear cells to said peptide is performed by adding a cell-free preparation of said  
20 peptide to said peripheral blood mononuclear cells and without adding additional cells to said peripheral blood mononuclear cells prior to step (d) of administering said labeled antigen-specific T lymphocytes to said mammal.
4. The method of Claim 1 wherein said antigen-specific T lymphocytes are cytolytic for cells that express said cell-specific antigen.

5. The method of Claim 1 wherein said antigen-specific T lymphocytes comprise CD4+ lymphocytes.

6. The method of Claim 1 wherein said antigen-specific T lymphocytes comprise CD8+ lymphocytes.

5 7. The method of Claim 1 wherein said antigen-specific T lymphocytes comprise CD45RO+ memory T cells.

8. The method of Claim 1 wherein said antigen-specific T lymphocytes comprise negligible amounts of natural killer (NK) cells.

9. The method of Claim 1 wherein step (d) of administering said labeled antigen-specific T lymphocytes to said mammal is performed without administering IL-2 to said mammal with said T lymphocytes or thereafter before performing step (e) of determining the distribution of said labeled antigen-specific T lymphocytes in said mammal.

10. The method of Claim 1 wherein step (d) of administering said labeled antigen-specific T lymphocytes to said mammal comprises administering said lymphocytes intraperitoneally.

11. The method of Claim 1 wherein step (d) of administering said labeled antigen-specific T lymphocytes to said mammal comprises administering said lymphocytes intravenously.

12. The method of Claim 11 wherein administering said lymphocytes intravenously comprises administering a glycoconjugate to said mammal such that said trafficking of said lymphocytes is altered compared to administering said lymphocytes without administering said glycoconjugate to said mammal.

13. The method of Claim 11 wherein administering a glycoconjugate comprising administering a glycoconjugate comprises administering asialoorosomucoid.

14. The method of Claim 11 wherein administering a glycoconjugate comprising administering a glycoconjugate comprises administering orosomucoid.

15. The method of Claim 1 wherein said method wherein said cell-specific antigen is a tumor-specific antigen.

5        16. The method of Claim 10 wherein said peptide displays an epitope of human mucin1 (MUC-1)

17. The method of Claim 11 wherein said antigen-specific T lymphocytes comprise CD4+ lymphocytes exhibit MHC unrestricted cytotoxicity for cells bearing said epitope of MUC-1.

10        18. The method of Claim 12 wherein said peptide displays an epitope of MUC-1 comprises an amino acid sequence that is a circular permutation of a MUC-1 sequence comprising the sequence PDTRP.

19. The method of Claim 13 wherein said peptide has the amino acid sequence GSTAPPAHGVTSAPDTRPAP.

15        20. The method of Claim 1 wherein said label is selected from the group consisting of a gamma emitter, a positron emitter, a magnetic material, a density based contrast material, and mixtures thereof.

21. The method of Claim 20 wherein the label is a gamma emitter selected from the group consisting of indium-111, technetium-99m, technetium-99, iodine-123, and mixtures  
20 thereof.

22 The method of Claim 21 wherein the label is indium-111.

23. The method of Claim 1 wherein said imaging is selected from the group consisting of radioimaging, magnetic resonance imaging, positron emission tomographic and X-ray computed tomographic imaging.

24. The method of Claim 23 wherein said imaging is selected from the group consisting of a single scan and serial scans.

25. The method of Claim 23 wherein said imaging comprises a total body scan of said mammal.

5           26. The method of Claim 23 wherein said imaging comprises at least two separate scans wherein each of said separate scans is selected from the group consisting of positron emission tomographic and X-ray computed tomographic imaging.

27. The method of Claim 26 wherein imaging data obtained from two or more separate scans are compared.

10           28. The method of Claim 26 wherein imaging data obtained from two or more separate scans are fused into a single display image.